

**Amendments to the Drawings:**

The attached replacement sheet makes changes to Fig. 5 and replaces the original sheet with Figs. 4 and 5.

Attachment: Replacement Sheet

**REMARKS**

Claims 1-8 are pending with claims 3 and 5 amended.

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration since the amendments amplify issues previously discussed throughout prosecution; (c) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (d) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

The attached replacement sheet for Figs. 4 and 5 further corrects Fig. 5. The label in the replacement sheet filed September 24, 2004 incorrectly identified block 11 as a voltage-splitter-multiple trigger when in fact the specification designates it a voltage-splitter-multiplier trigger (paragraphs [0024] and [0025]).

In paragraph 2, on page 2 of the Office Action, claims 1-8 were rejected under 35 U.S.C. §102(b) as being anticipated by Gloersen et al., U.S. Patent No. 3,151,259 (Gloersen). The rejection is respectfully traversed.

Applicants' claim 1 calls for a method for steering, in a direction Y, a supersonic projectile or a missile having a generally cone-shaped nose, that has a substantially pointed end, comprising discharging plasma over a limited sector of the outer surface of the nose and on the side of direction Y.

Applicants' claim 3 calls for a method for steering a supersonic projectile or a missile having a nose, generally cone-shaped, that has a substantially pointed end, comprising, for each change in the trajectory of the projectile or the missile, discharging plasma proximate

the end over a limited sector of the outer surface of the nose on a side corresponding to a direction toward which the trajectory is to be changed.

Applicants' claim 5 calls for a device for steering a supersonic projectile or a missile having a nose, generally cone-shaped, that has a substantially pointed end, comprising means for emitting a plasma discharge proximate the end over a limited sector of the outer surface of the nose on a side of the nose toward which direction the projectile or the missile is to be steered.

The Office Action identifies col. 1, lines 1-29 and Fig. 2 of Gloersen as supporting the rejection. However, the requirement that the plasma discharge is on the side toward which the projectile or missile is to be steered is directly counter to the teaching of Gloersen.

First, the cited reference lines talk about plasma propulsion for vehicles in regions of extremely low pressure, such as outer space, and used for spacecraft attitude control, orbit correction, orbit transfer or the like. Further, in col. 3, line 21 - col. 4, line 3, there is a description of what is shown in Fig. 2. As shown in the figure, and as described in the lines, a plasma discharge is made on the side opposite to the direction in which the spacecraft is to move. That is, in Gloersen the plasma accelerator is used as a thrust force which forces the spacecraft to move in a direction away from the source of the thrust.

Gloersen describes that plasma accelerator, the principle of which is to provide a large exhaust momentum by providing a very large velocity to a small mass of ionized gas (column 3, lines 21-24). This principle is achieved by injecting a small amount of gas, preferably having a low density, such as helium, hydrogen, argon or nitrogen (column 3, lines 16 and 17), between two electrodes 11, 12 and generating a high voltage between the electrodes 11, 12, which induces an ionization of the injected gas, i.e., a plasma. A magnetic field  $B_z$  is then generated, which provides an acceleration of the plasma in the direction of the exit from the accelerator.

This principle is an action/reaction. As a result, the aim is to obtain an expelled plasma from the accelerator near the nose of the craft with a high exhaust momentum in a direction Y to obtain a modification of the craft trajectory in a direction opposed to Y.

A craft using the operating techniques of Gloersen could not work at atmospheric pressure. Due to the high pressure which would be exerted by the atmosphere on the moving craft, the release of the small amount of gas with a high speed by such an accelerator would be insufficient to substantially modify the trajectory such as to steer the craft.

Conversely, Applicants' invention is for a missile or projectile, which includes a shell or a bullet, which encounters resistance to very high pressures at supersonic speeds. Such projectiles (projectile being used as an all-encompassing term for shells, bullets, projectiles and missiles) build up a shockwave upstream of their nose. When flying on a straight trajectory, the pressures distributed over the surface are balanced and thus the shockwave has symmetries based upon the shape of the projectile.

Applicants' invention uses plasma to unbalance the flow or shockwave at a particular point near the end of the nose, very close to the tip, to effect course correction. That is, using a plasma discharge, the pressure is changed in a discharge zone, distorting the shockwave, and thus the shockwave on the side opposite the plasma discharge forces the projectile in a direction toward the side at which the plasma discharge occurs (Applicants' Fig. 4).

Thus, the two inventions are used in different environments. The invention of Gloersen is being used in a near vacuum and the plasma discharge under such conditions acts as a thrust. In Applicants' claimed invention the plasma discharge disrupts the density distribution of the air surrounding the projectile surface by distorting the shockwave at one side of the projectile. The resultant dissymmetry moves the projectile in the direction of the side upon at which the plasma discharge occurs (see paragraphs [0021] - [0023]). This is exactly counter to the disclosed art.

Because the two inventions are being used in different environments, they are addressed to different problems. One is the control and movement through a near vacuum where a small thrust causes movement or a trajectory change opposite to the thrust and the second, Applicants' invention, is addressed to movement through an atmosphere where the imbalance in air density distributions results in a trajectory change in the direction at which the plasma discharge occurs.

As stated in *In re Sponnoble*, 160 USPQ 237, at 243 (CCPA 1969) "[a] patentable invention, within the ambit of 35 U.S.C. §103 *may* result even if the inventor *has*, in effect, merely combined features old in the art for their known purpose without producing anything beyond the results inherent in their use." The Court went on to state "[it] should not be necessary for this Court to point out that a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is *part* of the 'subject matter as a whole' which should always be considered...."

In *Sponnoble*, the inventions were substantially identical although the rejection was under 35 U.S.C. §103. However, the point the Court was making, the discovery of the problem may in and of itself constitute invention is pertinent to this rejection.

As H.T. Markey stated in Why Not the Statute?, 65 J. Pat. Off. Soc'y 331, 333-34 (1983), "Virtually all inventions are 'combinations', and...*every* invention is formed of 'old elements'....only God works from nothing. Man must work with old elements".

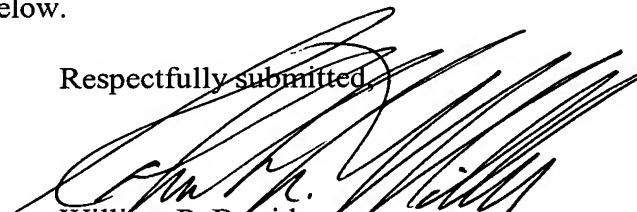
Applicants submit that the applied reference does not anticipate the claimed invention. Nor does the reference suggest the claimed invention because the reference is applied in a different environment and teaches a result opposite to Applicants' claimed invention. Therefore, the rejection under 35 U.S.C. §102 is inappropriate. Further, the only way one would say Gloersen suggests the claimed invention is if one used hindsight analysis looking

for bits and pieces of the invention without looking at the relationships found within the claim and those found within the Gloersen invention as Gloersen teaches away from both the environment and the result.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-8 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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